

Abstract Submitted  
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**Magnetocaloric properties of Co/Cr superlattices** TATHAGATA MUKHERJEE, University of Nebraska, RALPH SKOMSKI, DAVID SELLMYER, CHRISTIAN BINEK, University of Nebraska — Nanostructured materials aiming on refrigeration applications are experimentally realized by molecular beam epitaxial (MBE) growth of Co/Cr superlattices using mean-field theoretical concepts as guiding principles.<sup>1</sup> Magnetocaloric properties are deduced from measurements of the temperature and field dependence of the magnetization of our samples. More generally, the potential of artificial antiferromagnets for near room-temperature refrigeration is explored. The effects of intra-plane and inter-plane exchange interactions on the magnetic phase diagram in Ising-type model systems are revisited in mean-field considerations with special emphasis on tailoring magnetocaloric properties. The experimental results are discussed in light of our theoretical findings, and extrapolations for future improved nanostructures are provided. Financial support by NRI, and NSF through EPSCoR, Career DMR-0547887, and MRSEC.

<sup>1</sup>T. Mukherjee, S. Sahoo, R. Skomski, D. J. Sellmyer, and Ch. Binek, Phys. Rev. B **79**, 144406-1-9 (2009).

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